

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

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MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2018/2019

TCS2221 – COMPUTER GRAPHICS
(All Sections/Groups)

13 March 2019
02:30PM – 04:30PM
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of 3 pages (including cover page) with 4 structured questions.
2. Answer ALL questions. The distribution of the marks for each question is given.
3. Please write all your answers in the answer booklet provided.

Question 1

(a) A true-color RGB raster system (assume 16 bits per pixel) has a resolution of 1280 by 1024.

- i. How many pixels are there in one full screen?
- ii. What is the pixel depth of the system?
- iii. What is the frame buffer size in KB?
- iv. How many distinct colors choices (intensity levels) is available?
- v. How long would it takes to load if 10^6 bits can be transferred per second?

[5 marks]

(b) Given a straight line from an endpoint coordinate (2, 1) to coordinate (9, 6), indicate which raster locations would be chosen by the Digital Differential Analyzer Algorithm.

[5 marks]

Question 2

(a) List the four steps to perform texture mapping in OpenGL.

[4 marks]

(b) In visible surface detection, when a polygon is considered *invisible*?

[4 marks]

(c) Sweep representation is useful for creating 3D objects which have symmetric modelling transformation. Illustrate sweep representation on a torus generated using rotational sweeping.

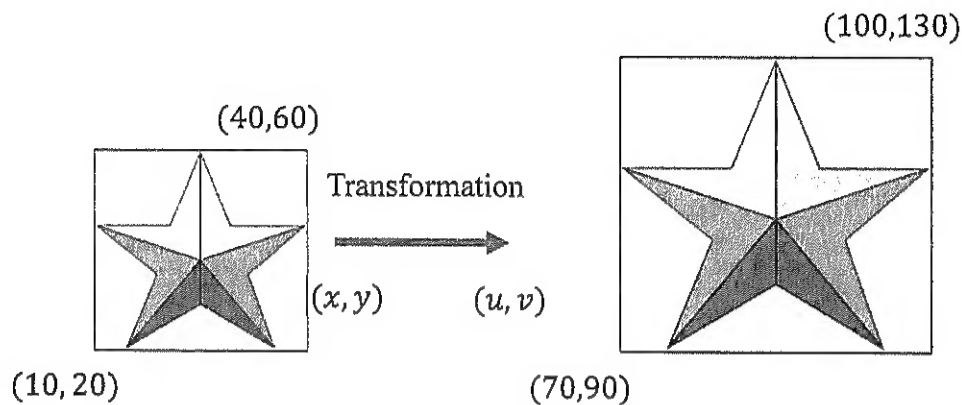
[2 marks]

Continued.....

Question 3

(a) The clipping window selects *what* the user wants to see; the viewport indicates *where* it is to be viewed on the output device. Given the following configurations, determine the Window-to-Viewport transformation.

[4 marks]



(b) List three surface rendering methods and provide the corresponding shading and interpolation methods.

[3 marks]

(c) Three control points of a Bezier curve are $P_0 = (2, 3)$, $P_1 = (4, 6)$ and $P_2 = (5, 7)$. What are the coordinates on the curve when the ratio is set to $u = 0.2$?

[3 marks]

Question 4

Translate a 2D object to coordinate (6, 8). Then, scales the object 4 times along X-axis and 10 times along Y-axis. Next, rotate the object at 60 degree anti-clockwise about Z-axis.

(a) List the matrices of translation, scaling, and rotation of the above transformations.

[3 marks]

(b) Find the composite matrix (C_m) for the transformation above.

[5 marks]

(c) What is the new coordinate if the same transformation is applied on point Q (80, 5)?

[2 marks]

End of Paper